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(54) **Artificial ski slope**

(57) Material for forming an artificial ski slope consists of oval monofilaments 4, Fig. 7, that are formed into loops, each end of each loop passing through holes spaced at a lesser distance than the widest width of the loop in a base material to form snap-locking bands on the underside of the base material to prevent the loops being pushed through the base material when they are subjected to compression and other forces.

The loops may be arranged in a multiple diamond pattern as in Fig. 1.

Additionally the oval monofilament loops may be provided with sleeves or covers 3, Fig. 7, in order to provide different textures or colour to the supporting loops.

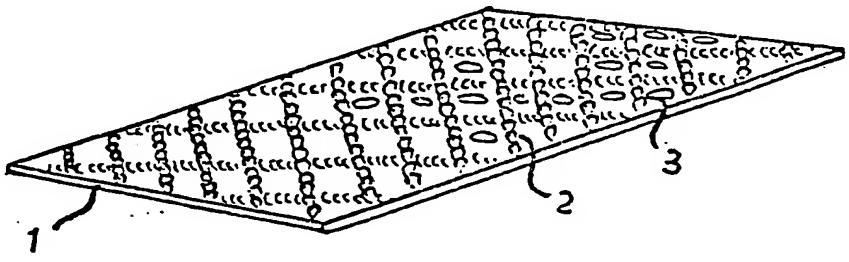

Fig 1

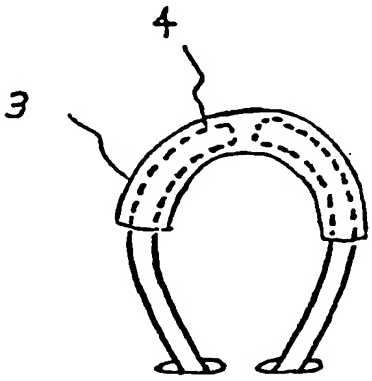

Fig 7

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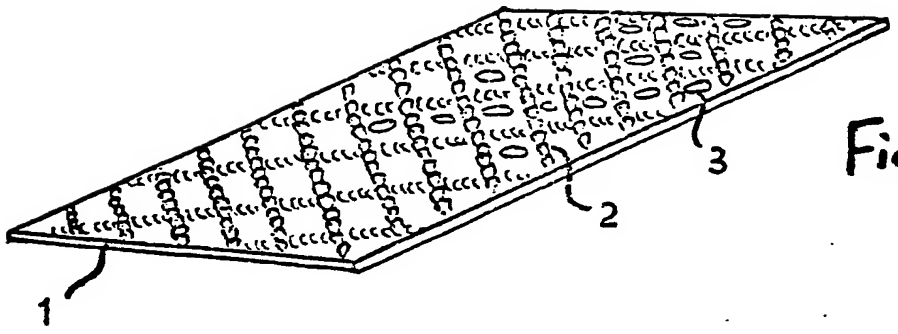

Fig 1

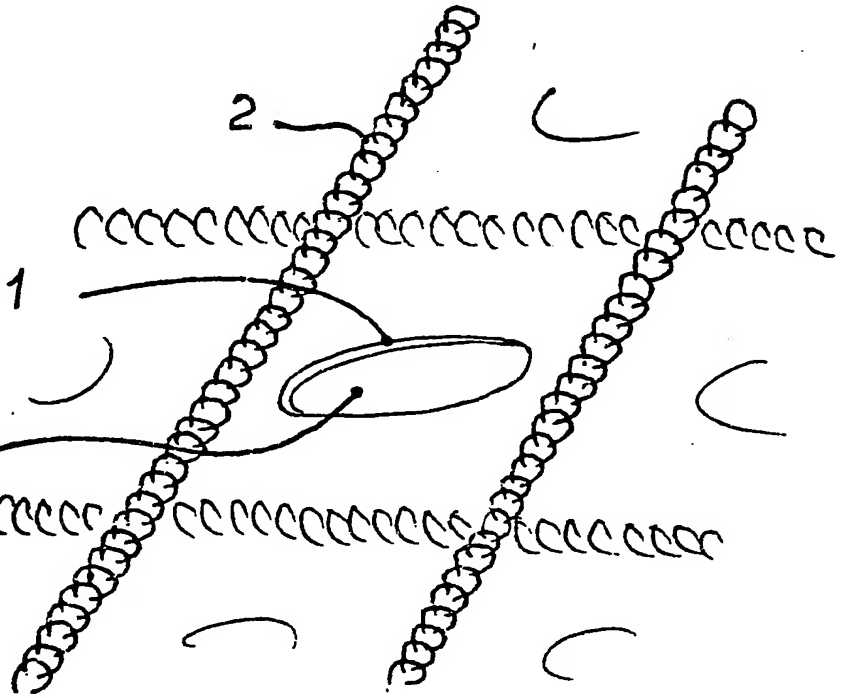

Fig 2

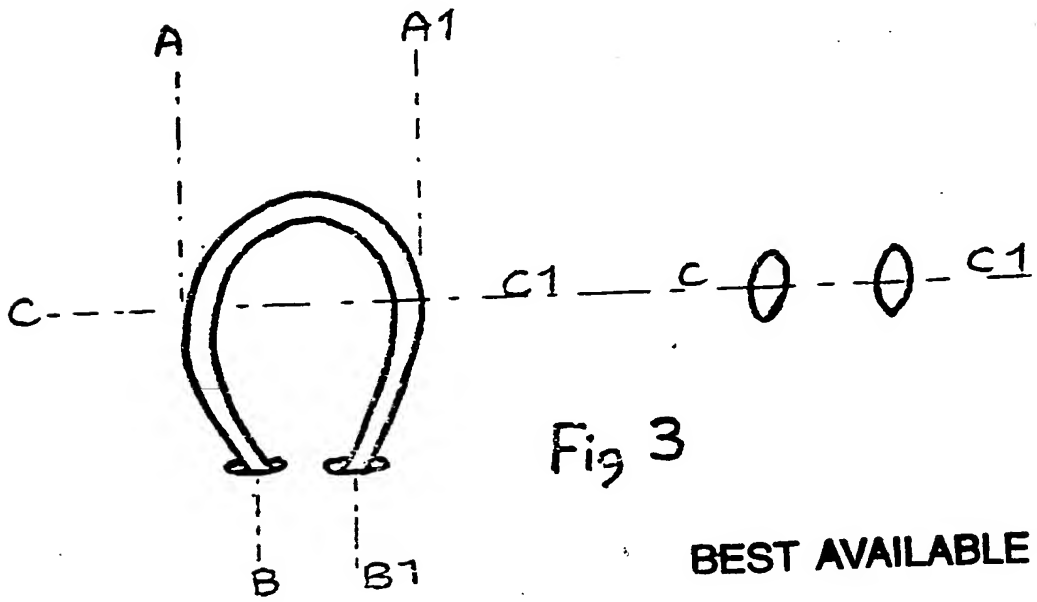

Fig 3

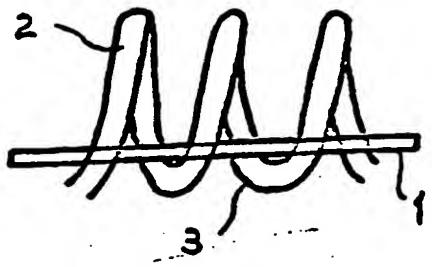

Fig 4

Fig 5

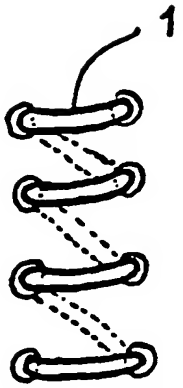

Fig 6

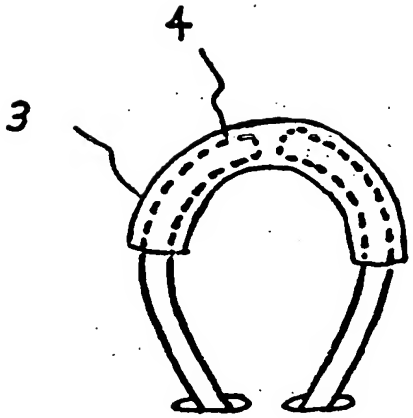

Fig 7

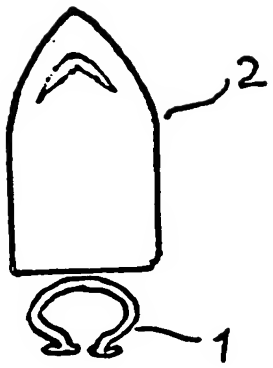

Fig 8

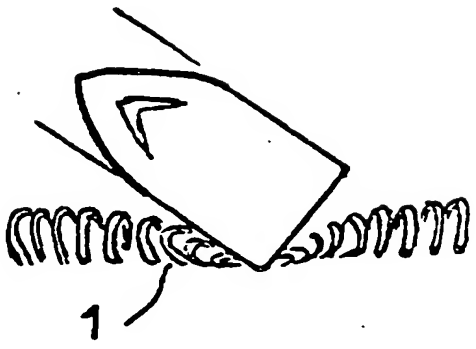

Fig 9

SPECIFICATION

Apparatus for reducing the friction on artificial ski slopes

Field of the Invention

This invention relates to apparatus for reducing the friction caused to 'running surfaces' of skis and other surface skimmers when used on said apparatus. The uses can be for sport as well as general transportation purposes.

Description of the Prior Art

There are numerous instances in the various arts such as noted by way of non limiting examples in the above Field of the Invention wherein it is useful, necessary or highly desirable to reduce the friction on ski soles.

In the past, dry artificial ski slopes have been constructed of brush bristles packed tightly together, but which tend with wear to tangle and flatten out with use. Debris including grit begins to accumulate and friction to the ski soles increases dramatically as a result.

Tightly packed brush ends collectively present an abrasive surface to the ski sole. Friction so produced tended to heat the ski sole and slow the ski's speed. Because of this drag factor lesser degree slopes cannot be used.

A loss of upright bristles however due to wear or breakage means loss of ski turning ability. Other types of artificial ski slope mats have included a variety of plastic protrusions originating from a plastic base. Although grouped together, after constantly being moved in different directions by the skier's ski movements they inevitably break off.

Ski jumping on the 'brush slopes' which tend to be rigid is regarded by many ski slope operators as causing spinal injury and thus often discouraged. Soles on skis subjected to these bristle mats and often accumulated grit and debris often have a life expectancy of only 25 hours skiing time.

The continuous top edge of the bristles of the ski slopes of the present state of the art do not separate and twist sufficiently to enable the ski to 'bed in' and provide a supporting 'banking slope' against which the ski edge can turn, as would naturally happen with snow.

Warnings about steepness of slopes for example are not easy to incorporate in the brushes in colour form as each mat is completed in the factory and destined for different ski centres.

Also it is not presently possible to change the physical make-up of the ski mat slope once the mats have been laid, to affect the friction properties of said mats.

Summary of the Invention and General Description

In order to overcome the problems of the prior art set forth above the present invention sets forth apparatus for reducing friction wherein one embodiment of the present invention is the provision of a special unique structure which enables skiing with less friction than those structures used in the present art.

My invention concerns the construction of a fabricated structure that can be used as a ski mat and is composed of loops of oval extruded monofilament preferably but not essentially 0.115 inch diameter, incorporated in a base material preferably but not essentially $\frac{1}{8}$ inch thick, which may be constructed of plastic.

Where the monofilaments enter or exit the base sheet material they must do so at a lesser distance than the widest part across the loop when not under compression. When using the oval filaments as described the base of the loops become 'snap locked' into position.

The monofilaments can be made of a number of materials, but by way of a non limiting example the preferred material is nylon. Held firmly at their bases the loops provide a flexible support that can withstand the weight of a skier yet remain flexible enough in compression and twisting to accommodate jumping and turning respectively.

My invention also describes the combination of the oval form of the monofilaments and the spacing of exit and entry into and from the base material less than the width of the loops at their widest part when not under compression, preferable but not essentially to 1 centimetre centres opposites and in line enabling the nylon or plastic monofilaments to be pulled into a snap-locking configuration able to bend sideways, and sustain compression under the normal weight of a skier.

The snap-locking ability of the oval monofilament loops arranged in this structure and in the manner described above is novel.

When each series of loops is formed in by way of a non limiting example a diamond shaped pattern on the base sheet preferably but not exclusively $\frac{1}{8}$ inch thick polyethylene the said configuration enables the ski to momentarily separate the upper reaches of the loops and yet provide sufficient support for the ski to turn at speed.

Loop filaments which go through the base material should preferably but not essentially be in the form of a coil. The upper loops can be strengthened or modified with the insertion of sleeves which may or may not be coloured to denote degrees of slopes or perimeter boundary warnings. The chemical and physical composition of the loop sleeves can be used to influence even more the performance of the skis.

My invention is also lighter in weight, is aerated by the open nature of the loops and because of the very open structure and rounded surface of the loops prevents the accumulation of grit and other debris.

This invention also enables slopes of lesser degrees of steepness to be used for skiing on artificial slopes where they could not have been established before.

Brief Description of the Drawings

Fig. 1 is a perspective view showing the apparatus for reducing friction on the soles of surface skimmers including skis in accordance with the teachings of the present invention, and showing also the base sheet material Fig. 1, 1.

Fig. 2 is a closer view of a part of Fig. 1 and shows

the holes that can be incorporated in order to facilitate ski stick 'prodding' for better balance of the skiers.

Fig. 3 is a front elevation of a loop of the apparatus where the ends exit and emerge from the base material.

Fig. 4 is a side view of a loop spiral configuration of the apparatus showing the tight self locking bands on the underside of the base material.

Fig. 5 is a perspective view of a spiral of loops which form the ski sole support and are incorporated in the top surface of the base material.

Fig. 6 is a view of the underside of the base material showing the tight self-locking bands being the lower ends of the loops and showing the direction of connection.

Fig. 7 is a front elevation of a loop of the apparatus which conforms to another embodiment of said apparatus showing an inserted sleeve.

Fig. 8 is a front elevation of a loop of the apparatus showing the effect of compression viz. that the loop partially flattens but due to the self-locking configuration the loop circumference remains the same length.

Fig. 9 is a side view of the loop spiral configuration showing how the loops lie back to form a support-channel or trough in the ski mat when a ski is sharply turned.

Preferred Embodiment

Although the invention is described herein as applied to artificial slope skiing it will be understood as noted above that the invention is not restricted to this use and there are many other applications in which the invention can be effectively utilized.

Fig. 1 shows the apparatus for reducing friction on ski soles when used on said artificial ski slopes. Into a suitable base material, by way of a non limiting example being $\frac{1}{8}$ inch thick polyethylene Fig. 1,1 is threaded an oval monofilament Fig. 1,2 Fig. 2,2 of nylon or other plastic of oval cross section Fig. 3, C.C1. The oval monofilaments are preferably but not essentially kept equidistant at the base surface Fig. 6 but the holes preferably but not essentially having a diameter of 5/32 inch must be made closer Fig. 3, B, B1 than the widest width of the loop Fig. 3, A, A1 when not under compression.

When the filaments are threaded as in Fig. 4,2 through base Fig. 4,1 and pulled, they 'snap-lock' fitting close to the underside of the base Fig. 6,1 Fig. 4,3. Ideally but not essential the loops Fig. 3, Fig. 5, Fig. 7 overall height should be $1\frac{1}{2}$ inch.

In this configuration Fig. 5 the loops can withstand the weight of a skier Fig. 8,1 and compress without pushing the filament 'lock loop' Fig. 4,3, Fig. 6,1 under the base Fig. 4,1 away from said undersurface. The monofilaments will also withstand distortion by being bent sideways or even twisted Fig. 9,1 again without movement of the underside bands Fig. 4,3 which remains 'locked'.

The top end of the filament loops Fig. 7,4 when parted can accommodate a sleeve Fig. 7,3 which can be of different material of different texture or colour. This facility could be used to provide softer or harder top surface, and when coloured can enable warning markings for slope gradient or perimeter boundaries, or for slowing down warnings. The sleeve Fig. 7,3 will also be free to slide around and thus spread out the ski wear around the surface.

Holes in the base material Fig. 1,3 Fig. 2,3 can be made to allow penetration and grip for the skier's ski sticks if required. The threaded spiral monofilaments Fig. 1,2 Fig. 2,2 are preferably but not essentially constructed in the layout of a diamond pattern but not limited to this configuration. The open loops enable aeration and thus heat caused by friction is reduced even further.

Other Embodiments of the Invention

Artificial 'ski mats' Fig. 1 could be used to accommodate by way of non limiting examples various surface skimmers such as toboggans and sail surfers or sail driven surface skimmers.

Ski mats Fig. 1 could be used to accommodate the free movement of components or packages pushed along a conveyor line framework as for example a static conveyor in factories or on farms.

CLAIMS

1. Friction reducing apparatus comprising: a base material having a plurality of openings formed therein; said inlet means for connecting oval monofilaments and outlet means for connecting said oval monofilaments to form spirals and said spirals consist of loops formed above said base material surface and said inlet and outlet means are spaced at a lesser distance than the widest width of the said loops; measured when not under stress, and said inlet and outlet means have diameters slightly larger than the oval monofilaments, wherein the said loops are then pulled to form snap-locking bands on the undersurface of said base material.

2. The structure as in claim 1 whereby the loops are formed of oval plastic monofilaments preferably but not essentially nylon extruded through a die 0.115 inch diameter.

3. The structure as in claim 1 and claim 2 wherein the improvement comprises loops which are formed by each end passing through the inlet and outlet holes whilst said holes are spaced at a lesser distance than the widest width of the loops; measured when said loops are not under stress.

4. The structure as in claim 2 and claim 3 whereby preferably but not essentially the loops form in plurality a spiral and said loops are preferably but not essentially of $1\frac{1}{2}$ inches in height constructed in rows that outline a diamond pattern.

5. The structure as in claim 3 and claim 4 wherein the improvement comprises the loop configuration being incorporating in a support base material preferably but not essentially $\frac{1}{8}$ inch thick using said inlet and outlet holes preferably but not essentially 5/32 inch diameter in said rows in line and opposites.

6. An apparatus according to claim 1 and claim 5 wherein the improvement comprises the novel combination of oval monofilament loops secured in said base material via said inlet and outlet holes having diameters slightly larger than the oval monofilaments; wherein the said novel

combination enabling the said loops when pulled upwards to form snap-locking bands on the undersurface of said base material.

7. The structure as in claim 6 and wherein the improvement comprises cutting the top of the loops and inserting covers or sleeves with internal diameter slightly greater than the overall diameter of the said oval monofilaments and said sleeves can be of different physical or colour composition in order to affect further the performance of friction reducing apparatus or indicate visible signs respectively.

8. As claim 7 wherein the rows of said loops are arranged in a multiple diamond pattern over the base material to form a mat as Fig. 1 and used as an artificial ski mat.

9. As claim 8 wherein apparatus is used as a conveyor to facilitate transportation of matter.

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